

CHAPTER 2

PLANNING AND DESIGN STUDY PROCESS

2-1. General.

a. Planning and design studies associated with interior areas are conducted using the same study requirements as other Corps investigations. Analysis procedures must assure that:

"Studies shall be conducted in accordance with all applicable laws, policies, and planning guidelines. In particular the district commander shall assure that . . . the requirements and intent of NEPA* are made an integral part of the planning process" (Reference 5).

* National Environmental Policy Act

b. This chapter presents an overview of the planning and designing study process, and describes specific study considerations for interior areas. Subsequent chapters utilize this information in describing hydrologic study strategies and analytical procedures.

2-2. Study Process.

a. Feasibility studies span investigative actions from initiation of a study through formulation and evaluation of alternatives, to selection and recommendation of a plan for authorization and implementation. Design studies refine and detail the functional components and aspects of the authorized plan to better accomplish authorized purposes.

b. Feasibility studies are performed to select appropriate action to solve a water resource problem and determine if it should be recommended for congressional authorization. Objectives of feasibility studies are to formulate a broad range of alternatives and to identify and recommend the best plan to solve a water resources problem. The report specifies the project purpose, features, location and benefits; and describes the cost and scale - such as level of protection, planned mitigation actions, cost sharing, and legal and institutional arrangements to assure project functioning. Results of these investigations are documented in a feasibility report herein termed the decision document. Supporting technical studies, apart from the feasibility reports, are therefore final in terms of evaluations and impacts important to congressional decision making on a construction commitment. A reevaluation study may be required following congressional authorization. The study may be a brief reaffirmation of the survey report, if conditions have remained stable, or a reevaluation study recommending modifications to meet changed conditions. The reevaluation is essentially an updated survey report (Reference 5).

c. Advanced Engineering and Design studies consist of the General Design Memorandum (GDM) and Feature Design Memoranda (FDM). The GDM's normally are performed following approval of the survey or reevaluation study. They should primarily report on investigations concerned with the engineering design of the system components necessary to achieve the plan formulated in the feasibility study. Feature Design Memoranda are generally prepared for each major feature of large or complex project. The GDM and FDM (if needed) form the basis for preparation of plans and specifications.

2-3. Planning Study Considerations.

a. Level of Detail. The level of detail should be commensurate with the study purpose and other technical elements. The level of detail of the planning studies should be sufficient to minimize post-authorization changes (Reference 5). Analyses should identify the type, size, and configuration of the components, economics (cost-benefits); financing and cost sharing; and performance criteria of each plan in the final array of alternatives. Real estate and operational requirements of the recommended plan should also be clearly defined.

b. Analysis Conventions.

(1) Economic and other project impact analyses are performed by the Corps of Engineers and others for several time- and development- related conditions. Important conventions are existing, base, and future conditions for with and without proposed project features in place.

(2) Existing conditions for the study area consist of measures and conditions presently in place. Base condition refers to measures projected to be in place during the first year of operation of the adopted plan. Analyses are performed for with and without flood loss reduction measures in place, the difference representing the accomplishments of the project. Existing measures, implemented prior to the base year, and measures authorized and funded for construction completion prior to the base year are assumed to be in place and included for both with and without conditions as described in the Planning Guidance Notebook (Reference 14).

(3) Determination of existing without plan conditions is an important aspect of the study process. The without plan is the condition most likely to prevail in the absence of the plans under investigation by the Corps. Existing flood hazard reduction projects should be considered in place with careful consideration given to the actual remaining economic life of existing structures. Flood hazard plans authorized for implementation, but not yet constructed, should be considered in place unless it can be clearly shown that implementation of the measures is unlikely.

(4) Assessments of the existing without conditions shall be of sufficient detail to establish viable economic (cost and flood damage), social, and environmental impact assessments of with conditions without further refinements throughout the remainder of the planning process.

(5) Future condition analyses are performed for the most likely future development condition projected to occur without the project. The impacts of implementing the project future with conditions are determined by comparisons to the without condition. The assessments are performed for specified future time periods. Sensitivity analyses may also be desirable or required to determine the stability (viability and operation) of measures and plans for other possible alternative future development scenarios. The basis for projecting changes in the existing conditions must be clearly stated. Projections must be based on supportable information.

c. Formulation and Evaluation.

(1) Procedures for formulating and evaluating flood loss reduction measures of interior areas are similar to planning procedures used in other types of investigations (Reference 7). The complexity of the process is dependent upon the nature of the study area, flood hazard, damage potential, and environmental and social factors. A comprehensive array of alternatives is formulated and evaluated through an iterative process until a final array of plans is developed.

(2) The types of measures (and performance) that are formulated into alternative plans should, most often, be significantly different. Alternative plans are formulated to emphasize and address different planning objectives. The final array of plans should thus address markedly different means of accomplishing one or more of the basic planning objectives.

(3) The formulation process should develop a variety of plans including plans that maximize national economic development (NED) (Reference 8) and consider environmental issues and nonstructural opportunities. The formulation process should develop and assess a Standard Project Flood protection plan for urban areas. This plan, along with the NED plan, typically identifies upper and lower bounds of likely project features, and provides insights as to the sensitivity and functional characteristics of the system and study. Other plans, comprised of different configurations, types of components, and performance standards, should also be formulated and evaluated.

(4) The NED plan is considered an anchor point from which recommended plans can be adopted. Selecting plans other than the NED plan must be well justified (Reference 7). In areas where the potential for catastrophic losses exists, plans with the Standard Project Flood level of protection as a minimum goal must be evaluated. Where failure of the measures would not result in catastrophic loss, the NED plan is the objective. The NED plan is the recommended plan for agricultural areas.

(5) Environmental considerations are an integral part of the formulation process, and its consideration is required by the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (Reference 1). Nonstructural measures can often be valuable components of interior plans. Comprehensive planning considers nonstructural measures as realistic candidates for reducing flood losses.

d. Plan Selection. The plan selected for recommendation is expected to emerge from the several steps involved in the planning process. The attributes, costs and benefits, and other impacts (those not possible to define monetarily) of the final plans, and degree to which they accomplish the basic planning study objectives are weighed to determine the recommended plan. The evaluation and formulation should be performed with active public participation and the final plan selection accomplished in that spirit. Costs and benefits should weigh heavily in the selection, but functional performance and considerations of social and environmental impacts should also receive major consideration. The hydrologic engineer should assume a major responsibility for assuring that the selection process adequately considers functional performance.

2-4. Design Study Considerations.

a. Overview. Corps of Engineers' policies related to design studies are documented in engineering regulation, Engineering After Feasibility Studies (Reference 10). The General Design Memorandum (GDM) and Feature Design Memorandum (FDM) study the detail design of the selected plan authorized by Congress. The type of components, configuration of the system, and performance standards are specified as part of the plan. The design study provides refinement detail sufficient to meet construction and subsequent operation and maintenance criteria. Refinement decisions are based on cost effective assessments of components and other aspects while maintaining the integrity of the recommended plan. Hydrologic design analyses should interface with other design elements to meet design objectives defined above.

b. General Design Memorandum. Post-authorization studies of individual projects require the submission of a General Design Memorandum which provides an overall technical project perspective. The GDM is primarily a functional design document concerned with technical design of the system components selected in the Survey study. There may be individual feature design memoranda in certain circumstances.

c. Feature Design Memorandum. The Feature Design Memorandum, after approval, is the basis of preparation of plans and specifications of an authorized project. For complex projects, the results of the design studies of individual features of a project are prepared in separate feature design memoranda. These are scheduled so that the preparation of contract plans and specifications for individual features, which depend on prior approval of other feature design memoranda, will not be delayed.